

Claims

What is claimed is:

1 A driver circuit for an optical source, the driver circuit comprising:  
at least an input stage and an output stage, the output stage being operatively coupled

5 to the input stage;

a current generator circuit adapted to establish a modulation current for application to one of a first output and a second output of the output stage in accordance with an input data signal applied to the input stage; and

10 an output load detection circuit having first and second inputs coupled to the respective first and second outputs of the output stage, the output load detection circuit being configured to detect an improper load condition at one or more of the first and second outputs of the output stage and to generate a corresponding output indicator;

the output indicator being utilizable in the driver circuit to control the modulation current so as to prevent saturation of at least one device in the output stage in the presence of the improper load condition.

2. The driver circuit of claim 1 wherein the optical source comprises a laser diode.

3. The driver circuit of claim 1 wherein the output stage comprises a differential pair.

20 4. The driver circuit of claim 1 wherein the input data signal comprises a differential data signal applied to a differential pair of the input stage.

25 5. The driver circuit of claim 1 wherein the input data signal comprises a single-ended input data signal configured for conversion internally to the driver circuit to a differential data signal adapted to control application of the modulation current to the first and second outputs of the output stage.

10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

6. The driver circuit of claim 1 further comprising an intermediate stage operatively coupled between the input stage and the output stage.

7. The driver circuit of claim 6 wherein the intermediate stage comprises a push-pull stage  
5 having a top portion which is driven by outputs of the input stage and drives the output stage, and a bottom portion which is driven by differential data corresponding to the input data signal.

8. The driver circuit of claim 1 wherein the first and second outputs of the driver circuit are  
10 associated with respective collector terminals of corresponding transistors of an output stage differential pair of the driver circuit.

9. The driver circuit of claim 1 wherein the output indicator comprises a single-bit output flag.

10. The driver circuit of claim 1 wherein the output load detection circuit is configured to determine if a voltage level of at least one of the first and second outputs of the output stage drops below a designated load detection sense threshold.

11. The driver circuit of claim 10 wherein the load detection sense threshold is approximately 1.2 volts.

12. The driver circuit of claim 10 wherein the load detection circuit further comprises:  
first and second voltage dividers coupled to respective first and second outputs of the  
output stage;  
25 first and second comparators each having a first input coupled to a corresponding one of the first and second voltage dividers and a second input coupled to a voltage reference; and an output logic gate configured to receive as inputs corresponding outputs of the first and second comparators, the output logic gate generating the output indicator.

13. The driver circuit of claim 12 wherein the designated load detection sense threshold is given by:

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$$\left(1 + \frac{R1}{R2}\right) VREF,$$

where VREF is the voltage reference, and R1 and R2 are resistors of a given one of the first and second voltage dividers.

14. The driver circuit of claim 1 wherein the output indicator generated by the output load detection circuit is operative to disable the generation of the modulation current in the current generator circuit.

15. The driver circuit of claim 1 wherein the output indicator generated by the output load detection circuit is operative to control the application of the modulation current to the output stage.

16. An integrated circuit comprising:

at least one driver circuit for an optical source, the driver circuit comprising:

at least an input stage and an output stage, the output stage being operatively coupled

20 to the input stage;

a current generator circuit adapted to establish a modulation current for application to one of a first output and a second output of the output stage in accordance with an input data signal applied to the input stage; and

25 an output load detection circuit having first and second inputs coupled to the respective first and second outputs of the output stage, the output load detection circuit being configured to detect an improper load condition at one or more of the first and second outputs of the output stage and to generate a corresponding output indicator;

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the output indicator being utilizable in the driver circuit to control the modulation current so as to prevent saturation of at least one device in the output stage in the presence of the improper load condition.

5 17. An apparatus comprising:

an optical source; and

a driver circuit coupled to the optical source, the driver circuit comprising:

at least an input stage and an output stage, the output stage being operatively coupled to the input stage;

10 a current generator circuit adapted to establish a modulation current for application to one of a first output and a second output of the output stage in accordance with an input data signal applied to the input stage; and

an output load detection circuit having first and second inputs coupled to the respective first and second outputs of the output stage, the output load detection circuit being configured to detect an improper load condition at one or more of the first and second outputs of the output stage and to generate a corresponding output indicator;

the output indicator being utilizable in the driver circuit to control the modulation current so as to prevent saturation of at least one device in the output stage in the presence of the improper load condition.

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